

### **REMARKS**

Claims 1-17 are all the claims pending in the application. Claims 2 and 3 are canceled. Claims 4-10 are withdrawn from consideration. Claims 1 and 11-16 are rejected. Claim 1 is amended. Claim 17 has not been examined.

#### ***Request for New Office Action***

The Examiner states in the Office Action Summary that claims 1 to 16 are pending and rejects claims 1 and 14-16. However, in the Amendment filed on June 22, 2009, new claim 17 also was added and appears in PAIR. This claim, which depends from claim 16 and adds further limitations that distinguish over the prior art, has not been examined. Accordingly, Applicants respectfully request a new Office Action that considers this previously submitted claim. For reasons given herein, the claim is patentable..

#### ***Election/Restriction of Invention***

The Examiner acknowledges Applicants' election of Group II claims 11-14 without traverse. The Examiner states that the claims under consideration are 1 and 11-16. As already noted, claim 17 depends from claim 16 and also should have been included in the elected group.

#### ***Claim Rejections - 35 U.S.C. § 103***

**Claims 1 and 11-16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Onoda et al (JA 2002-220259) with either Miyamoto et al (JA 2001-167427) or Miyamoto et al (US 2002/0110706) - either in further view of Isono et al (US 2005/0284179).** This rejection is traversed for at least the following reasons.

#### **Amended Claim 1**

The present invention, as now recited in the above-amended claim 1, relates to a magnetic disk glass substrate for use in a hard disk drive and having a disk thickness of less than 0.5 mm and mirror-finished and chemically-strengthened main surfaces. Thus, the magnetic disk glass according to the present invention is suitably used for a small hard disk drive (having a disk thickness of less than 0.5 mm) capable of being installed in highly mobile apparatuses.

Furthermore, according to the present invention recited in the above-amended claim 1, the product of the thickness of the tensile stress layer and the maximum tensile stress of the tensile stress layer falls within a range of 0.4 to 2.0 kg/mm, the impact resistance is 3000 G or more and, the waviness (Wa) is 1.0 nm or less.

These are features of the present invention recited in the above-amended claim 1. None of the cited references discloses or suggests these features.

### **Claim 11**

The present invention recited in claim 11 relates to a method for manufacturing a magnetic disk glass substrate for use in a hard disk drive and having a disk thickness of less than 0.5 mm and mirror-finished main surfaces. Thus, the magnetic disk glass according to the present invention is suitably used for a small hard disk drive (having a disk thickness of less than 0.5 mm) capable of being installed in highly mobile apparatuses.

Furthermore, according to the present invention recited in claim 11, the melted mixture of at least three alkali metal nitrates contains 0.001% to 0.3% by volume of a nitrate of alkali metal having a smallest ion radius among the alkali metal nitrates so as to satisfy both high impact resistance and low waviness (Wa).

These are features of the present invention recited in claim 11. None of the cited references discloses or suggests these features.

### **Onoda**

In particular, Onoda disclosed dipping the glass substrate into the water solution containing the lithium salt to suppress the alkali elution from the surface of the glass substrate.

Although the Examiner points out the paragraph [0014], [0023], [0028], [0030], [0031] at page 3 of the Office Action, Examples 1-4 do not relate to the chemically-strengthening. This is because in the chemically-strengthening, the molten salt is used. A water solution is not used.

Although Onoda discloses “the thickness of 0.3-1.0 mm” at paragraph [0036], Onoda fails to disclose the above-feature of the present invention, i.e., “the impact resistance is 3000 G or more for the magnetic disk glass substrate for use in the hard disk drive and having a disk thickness of less than 0.5 mm”.

Although Onoda discloses the chemically-strengthening at paragraph [0038], Example 5, Onoda merely discloses the combination of the normally-used molten salts. Thus, Onoda does not teach the above-features of the present invention, i.e., “the melted mixture of at least three alkali metal nitrates contains 0.001% to 0.3% by volume of a nitrate of alkali metal having a smallest ion radius among the alkali metal nitrates so as to obtain both high impact resistance and low waviness (Wa)”.

#### **Miyamoto**

Miyamoto relates to the 2.5 inch hard disk drive, the 3 inch hard disk drive and the 3.5 inch hard disk drive as described at paragraph [0038].

However, recently, a small hard disk drive (having a disk thickness of less than 0.5 mm) has been installed in highly mobile apparatuses (see paragraph [0009] of the instant specification). Because of such a change of the application, higher impact resistance is has been required. With increase of information recording density of the magnetic disk, techniques adopted in the 2.5 inch hard disk drive or the 3.5 inch hard disk drive do not satisfy the higher impact resistance (see paragraph [0016] of the instant specification). The present invention has been made under such a background.

Miyamoto fails to disclose the higher impact resistance “3000 G or more” of the present invention.

Miyamoto discloses that the durability against defects or the resistance to destruction property is degraded if the value of the compressive stress is low.

However, Miyamoto fails to teach the magnetic disk glass which is used for a small hard disk drive (having a disk thickness of less than 0.5 mm) capable of being installed in highly mobile apparatuses.

By contrast, according to the present invention, the impact resistance is 3000 G or more so as to be used for a small hard disk drive (having a disk thickness of less than 0.5 mm) capable of being installed in highly mobile apparatuses.

Furthermore, Miyamoto does not disclose the feature of the present invention, i.e., “the waviness (Wa) is 1.0 nm or less”.

Miyamoto discloses that if the compression stress layer is high, the waviness and the shape of the outer peripheral portion are degraded so that the head flight becomes unstable. However, it is known that second moment of area with respect to rigidity is proportional to the cube of the thickness. Under this circumstance, the waviness is extremely strict for the product having a disk thickness of less than 0.5 mm. For example, the rigidity of the 1 inch hard disk (having a disk thickness of 0.381 mm) is as low as about 20 % in comparison with the 2.5 inch hard disk (having a disk thickness of 0.635 mm). Therefore, development with respect to the waviness has different level of difficulty.

Moreover, in addition to the waviness, the high impact resistance is required as mentioned above. Therefore, development entirely different from that of the 2.5 inch hard disk is required in the 1 inch hard disk. Under such a strict circumstance, the present invention has the feature, i.e., “the waviness (Wa) is 1.0 nm or less”.

As described above, the present invention is clearly different from Miyamoto in required impact resistance and waviness (Wa).

### **Isono**

Isono fails to disclose two key features of the present invention, i.e., “the impact resistance is 3000 G or more so as to be used for a small hard disk drive (having a disk thickness of less than 0.5 mm) capable of being installed in highly mobile apparatuses”.

Furthermore, Isono fails to disclose the feature of the present invention, i.e., “the melted mixture of at least three alkali metal nitrates contains 0.001% to 0.3% **by volume** of a nitrate of

alkali metal having a smallest ion radius among the alkali metal nitrates". Isono discloses that the molten salt used in the chemically strengthening may be two kinds or three kinds and 0.5 % to 3 % **by weight** of lithium nitrate is preferable in case of three kinds.

By contrast, according to the present invention, at least three alkali metal nitrates are mixed in the above-condition so as to satisfy both high impact resistance and low waviness (Wa) for a small hard disk drive (having a disk thickness of less than 0.5 mm). Isono does not teach such features of the present invention.

**Claims 12-17**

As discussed above, the cited references fail to disclose the features of the present invention as defined in claims 1 or 11. Accordingly, the present invention, as defined by these parent claims and the dependent claims 12-17, is clearly patentable over the cited references.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

*/Alan J. Kasper/*

SUGHRUE MION, PLLC  
Telephone: (202) 293-7060  
Facsimile: (202) 293-7860

WASHINGTON OFFICE

**23373**

CUSTOMER NUMBER

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Alan J. Kasper  
Registration No. 25,426